Apparent inter- and intraspecific brood-parasitism in a nest of Tufted Duck *Aythya fuligula*

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The cuckoos and their passerine hosts represent a classic example of an interspecific brood-parasitism system (Davies 2000). Meanwhile, intraspecific brood-parasitism, where conspecific females lay their eggs in the nest of other females, has been documented in a range of taxa that includes waterbirds, pheasants and passerines (Yom-Tov 2001). Duck species probably more commonly exhibit facultative (inter- and intraspecific) brood-parasitism than other avian groups (Geffen & Yom-Tov 2001). However, a brood parasitised with both inter- and intraspecific eggs is rarely reported in breeding duck colonies.

During our fieldwork at Lake Baikal, Russia, on 5 July 2008, we recorded what we believe to have been such a nest on an anonymous island near Kurma (53°10'N 106°58'E), by the central-western shore of Lake Baikal. A female Tufted Duck *Aythya fuligula* that was incubating the eggs was flushed when we approached the nest. The nest was located in low dense scrub intermixed with dry and fresh grass. Inside the nest were 16 eggs, including 11 pale olive or olive-grey eggs, four creamy-white eggs and one apparently larger creamy-white egg (Plate 1).

The eleven pale olive or olive-grey eggs, forming the majority of this brood, fit the general description of eggs of Tufted Duck (Cramp & Simmons 1977). We also found several broods of Tufted Ducks nearby Lake Baikal and this type of egg was common within the colonies we visited (Plate 2). The four creamy-white eggs were of the same size as the eggs of Tufted Ducks. We assumed that these eggs also belonged to Tufted Ducks but represented a colour variation for the following two reasons. First, we have seen this type of egg in clutches of Tufted Ducks. Second, it is unlikely that this type of egg belongs to other sympatric breeding ducks at Lake Baikal based on egg size and the characteristics of the nesting site. The only egg similar in shape is that of Common Pochard *Aythya ferina*; however, this species rarely breeds on the islands in the Kurma region, but nests in the marshes at the Selenga Delta at the south-eastern shore of Lake Baikal. Because it is impossible that the same female can lay eggs of two colours in the same clutch (Kilner 2006), we assumed that another female laid these four creamy-white eggs.

The outlier among the 16 eggs was one creamy-white egg, c.25% larger in size. Although we did not take the measurements of this egg, given its exceptionally larger size we can exclude the possibility of any *Anas* and *Aythya* ducks in the region (unless a double yolk was involved—an extremely remote possibility: R. M. Kilner *in litt.* 2012). The only two candidate species that fit the size of this egg are White-winged Scoter *Melanitta deglandi* and Red-breasted Merganser *Mergus serrator* (Cramp & Simmons 1977, Baicich & Harrison 1997). However, the latter very rarely builds nests on the ground in vegetation (but a ground nest has been found in the south of the Selenga delta: I. Fefelov *in litt.*), as it usually nests in cavities under cliffs (Cramp & Simmons 1977); indeed, we located several such nests on rocky islands near Kurma. In contrast, this egg seems more likely to have been laid by a female White-winged Scoter, since this species has the same nesting preferences as Tufted Duck, which favours bushy sites (Cramp & Simmons 1977, Kear 2005). White-winged Scoters were observed in close proximity, although we were unable to locate a nest of this species; but subsequently, staff at the Wildfowl and Wetlands Trust, Slimbridge, UK, were able to review Plate 1 and confirm that this large egg indeed belongs to a scoter (B. Hughes *in litt.* 2012).

Confirmation of inter- or intraspecific brood-parasitism involves several methods, including morphological identification, biochemical and genetic diagnosis, and abnormal laying events, large clutch-size or late hatching events (Yom-Tov 1980, 2001). Applying these methods for determining parasitic eggs in breeding colonies may be challenging due to difficulties of egg-collecting in the field. Intraspecific parasitic eggs are easier to identify than those of conspecifics because of larger egg variation between species. In our case, it was not possible to use biochemical and genetic methods to identify these eggs unambiguously. Nonetheless, our method of combining information of local breeding duck species, egg morphology and nesting preference supports the assumption of this usual nest being a case of inter- and intraspecific brood-parasitism.

Inter- and intraspecific brood-parasitism has prompted several hypotheses (Sayler 1992, Beauchamp 1998). However, brood-parasitism in the Anatidae can be influenced by several phylogenetic and environmental factors (reviewed in Kear 2005), highlighting the importance of documenting more cases in the field. To our knowledge, this is the first case of a female Tufted Duck incubating a parasitic egg from White-winged Scoter.

Plate 1. The clutch of a Tufted Duck *Aythya fuligula* with (A) a parasitic egg from White-winged Scoter *Melanitta deglandi*, (B) eggs laid by another female Tufted Duck found near Kurma, Russia, 5 July 2008.

Plate 2. Nest of Tufted Duck *Aythya fuligula* found near Kurma, Russia, 3 July 2008. (Both photographs by the authors.)

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Annual survival rate and mean life-span of Lemon-bellied White-eyes *Zosterops chloris flavissimus* on Kaledupa island, Wakatobi, south-east Sulawesi, Indonesia

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White-eyes (Zosteropidae) are known to be the most rapidly speciating family of birds on the planet (Moyle *et al.* 2009). One of the reasons that white-eyes manage to adapt and exploit new habitats so well is because of their relatively short generation time (and greater Darwinian fitness); some *Zosterops* species may breed within six months of hatching (Moyle *et al.* 2009). However, while the breeding age of white-eyes appears to be relatively well known, there is less information on the longevity of these species. One might anticipate that such small species are destined to have rather short life-spans (Hulbert *et al.* 2007).

Our team makes regular trips to south-east Sulawesi, Indonesia, as part of a long-running island biogeography project on local bird species, in cooperation with Operation Wallacea Limited. As part of this work, we mist-net and colour-ring birds in the area. Recently (August 2010), we retraced the footsteps of a previous expedition (August 2007) with great precision. This allowed us the opportunity to assess site-fidelity and longevity of a number of regularly trapped small passerine species, notably: Lemon-bellied White-eye *Zosterops chloris*, Olive-backed Sunbird *Cinnyris jugularis*, Grey-sided Flowerpecker *Dicaeum celebicum* and Island Monarch *Monarcha cinerascens*. We visited three sites (Bakau, Air Nounou, Latafe) on the island of Kaledupa, Wakatobi, south-east Sulawesi in both 2007 (using yellow colour rings) and 2010 (using mauve colour rings) and mist-netted with similar equipment in similar habitats. As many of the local shrubs grow at remarkable speeds, it was not always possible to identify previous net-ride locations. However, local guides and GPS co-ordinates confirmed the accuracy of our site selection. During our 2010 visit we trapped four birds bearing the yellow rings we had used during our 2007 visit. All of these birds were Lemon-bellied White-eyes.

We are confident that the Lemon-bellied White-eyes trapped in 2007 were adult birds. We have occasionally trapped white-eyes in juvenile plumage on the Wakatobi islands (5/548 white-eyes trapped), but have rarely trapped beyond early September. The breeding season for Lemon-bellied White-eyes on the nearby islands of Muna and Buton is between September and October (van Balen 2008). It therefore seems likely that the breeding season for the Wakatobi island white-eyes is similar. If this is the case, then the retrapped birds, when they were trapped in 2007, must have been at least one calendar year old. So, when the birds were retrapped in 2010, they must have been at least four years old. We used these ages to calculate a minimum adult survival rate for the Kaledupa birds.

We trapped a total of 48 Lemon-bellied White-eyes in 2007 and retrapped four of those birds in 2010. This gives a minimum percentage of 8.3% of birds surviving into their fourth calendar year on Kaledupa. In order to allow 8.3% of the adult population to survive into their fourth calendar year, the minimum annual survival rate of the local population must be 43.6%. This value is in excess of the annual survival rates recorded for African Yellow White-eye *Z. senegalensis* (34%) near Jos, Nigeria (McGregor *et al.* 2007) and Silvereyes *Z. lateralis* (24–26%) in central Victoria, Australia (Burton 1996). Longevity may be derived from annual survival rate, where mean life-span = –1/ln(annual survival rate) (Seber 1982). Applying this formula, we get a mean life-span for the Lemon-bellied White-eyes of Kaledupa of 2.2 years (1.2 years from survival rate + 1 year at initial capture). As the survival rate value is a minimum, the calculated life-span is a minimum value too. However, this minimum value for the Kaledupa birds is greater than the mean life-spans of the African Yellow White-eyes near Jos (1.92 years = 0.92 years from survival rate + 1 year at initial capture) and the Silvereyes in central Victoria (9.8–10.2 months) (Burton 1996).

It is likely that the value cited by Burton (1996) includes birds born during the year of capture. Annual survival rates of adults are usually higher than those of fledglings (Freed & Cann 2009). The Capricorn White-eye of Heron Island *Z. lateralis chlorocephalus* has an annual adult mortality of 38.5% (Brook & Kikkawa 1998). This is equivalent to an annual adult survival of 61.5% (a value in excess of the Kaledupa birds) and translates to an average life span of 3.1 years (2.1 years from survival rate + 1 year at initial capture).

The Lemon-bellied White-eyes, when retrapped in 2010, appeared to be in breeding pairs (one male and one female